ditional notes have been received, giving the dates and locations of slight shocks:

June 3.—*Washington*, Lakeside, slight, time not given.

6th.—*Kentucky*, Richmond, 2:30 a. m.

8th.—*California*, Ukiah.

9th.—*California*, Upperlake, 12:45 p. m.; Ukiah.

11th.—*Vermont*, Vernon, 1:45 a. m.; jarred the house. *California*, Ukiah.

14th.—*Alabama*, Riverton, slight. *Arkansas*, Corning, 9:20 a. m.; Osceola, 9:28 a. m. *Kentucky*, Blandville, Owensboro, and Union City, at about 9:15 a. m. *Missouri*, New Madrid, 9:20 a. m., several seconds' duration; Gordonville, 9:25 a. m. *Tennessee*, Bolivar, Wildersville, and Savannah, 9:30 a. m.; Memphis, 9:25 a. m., lasting two minutes. *Indiana*, Evansville, 9:30 a. m.

23d.—*California*, Descanso, 1:44 p. m.

24th.—*California*, Descanso, 2:45 p. m.

26th.—*Kentucky*, Richmond, 2:30 a. m.

30th.—*California*, Los Angeles, 11:28 p. m., shock from southwest to northeast of about two seconds' duration. The shock seems to have been of a local character. Articles were thrown about, and a rumbling noise was heard. No reports of a quake from any neighboring city were received, notwithstanding numerous inquiries.

MATHEMATICS AND METEOROLOGY.

A student asks that a brief course of mathematics be laid out for him which will fit him to teach meteorology to ordinary college classes. He does not himself wish to go into extended research work in mathematical meteorology, but he wants to get enough mathematics to give him an understanding of meteorological text-books and articles. His present preparation is that ordinarily pursued for entrance into the freshman class, namely algebra, plane geometry, and plane trigonometry.

Assuming that the applicant wishes to teach the correct theory or explanation of meteorological apparatus, such as is given in the "Treatise on Meteorological Apparatus and Methods," published in the Report of the Chief Signal Officer for 1887, and that he also wishes to thoroughly understand, if not teach, the thermodynamics implied in such text-books as those of Ferrel, Davis, and Waldo, and which forms the vital part of dynamic meteorology, and that he, furthermore, wishes to fortify himself as to fundamental principles which should guide one in the study of statistical climatology, it is probable that his wisest course is to spend at least two years more in the study of pure mathematics, and, also, two years in practical work in the laboratory on experimental and theoretical physics. Assuming that his lectures and text-books must be in the English language, we can in the following lines refer only to a limited number of works in that language, but, if any way possible, the student should be careful to select as his teacher or adviser one who is familiar with what is published in other languages.

The first step must be to conquer solid geometry, spherical trigonometry, and analytical geometry, to which end one may take almost any one of the serial school text-books, such as those of Bowser, Chauvenet, Loomis, Newcomb, Todhunter, Wells, Wentworth, or Williamson.

Next to these analytical treatises graphics must claim his attention, viz, perspective, descriptive geometry, the projections of the sphere, as applications of these are continually occurring in meteorological work.

The mechanics of masses, whether solid, liquid, or gases, is, of course, fundamentally important, and before attacking the more difficult treatises it is advisable to study some elementary work, such as Smith's Elementary Mechanics, which was first prepared in 1849 for the students at Wesleyan but was subsequently taught to the students of the Naval Academy at Annapolis. In connection with this, read the Elementary Mechanics of Oliver J. Lodge and, also, Clerk Maxwell's little manual, Matter and Motion.

As some knowledge of the whole range of physics is essential, the student may take up for elementary home reading the admirable Everett's Translation of Deschanel, and will also profit as to more recent discoveries by reading Barker's Physics in that connection. The first part of Deschanel has to do with mechanics and should be read in connection with works previously mentioned. The chapter of Deschanel on heat should also be read in connection with the special treatises of Maxwell, Stewart, Tillman, or Tait in order that the student may get the elements of thermodynamics clearly before his mind.

The preceding will prepare one for nearly all that is necessary in order to understand my Treatise on Meteorological Apparatus and Methods, most of which, in fact, the student should have read as he progressed in the study of physics.

As a guide to reasoning upon statistical climatological data, some treatise on probability, such as Merriman's Least Squares, may now be read, after which the student will proceed with ease through the Short Memoirs, translated in the Smithsonian Report for 1877.

The student should now prepare himself to study and appreciate thermodynamics and hydrodynamics. He will, already, have learned something about these from the works on physics above mentioned, but he will not make satisfactory progress in reading recent works in which these are applied to meteorology without first mastering the elements of the Calculus, for which study there are several excellent treatises, such as those of Bowser, Byerly, Courtenay, Todhunter, Williamson, to which should be added some treatise on differential equations, such as that of Boole or Johnson, and some treatise on the potential function, such as that of B. O. Peirce. From these he may proceed to such works as Bartlett's Analytical Mechanics, Tait's Thermo-Dynamics, and Lamb's Hydrodynamics. Selected portions of the latter work may be chosen for their special bearing on atmospheric motion, and as preliminary to reading the translations of memoirs on the Mechanics of the Earth's Atmosphere, published by the Smithsonian Institution in 1893.

This seems a rather long journey before entering the realm of current literature in dynamic meteorology, but these are the royal gates through which one would prefer to pass in order that he may fully appreciate the present and future of our science. The path would be shortened if one or two special treatises were available for this purpose, or if one could read with another who had previously gone over the whole ground. In fact, much of this was condensed by Ferrel into one volume, viz, his Recent Advances, published in 1885, which is very convenient for reference, but is thought to be too difficult to commend to the young student.

METEOROLOGY BY CORRESPONDENCE.

The so-called system of university extension in which it is sought to bring to the very doors of the homes of distant students many of the privileges enjoyed by those who study in person within the halls of the great universities is generally considered as applicable, especially to the study of philosophy, languages, and history, but not with great success to the physical sciences, since any advanced course in the latter demands an extensive laboratory apparatus. Among the sciences, descriptive botany, mathematical astronomy, mechanics, and pure mathematics have been included in the university extension work, but meteorology among others has been omitted, as far as we are aware. Now our experience assures us that there really is a widespread popular desire to come to a